

WHAT IS CLAIMED IS:

1 1. For use in a fixed-size packet switch, a switch fabric
2 comprising:

3 N input buffers capable of receiving incoming fixed-size
4 data packets at a first data rate and outputting said fixed-size
5 data packets at a second data rate equal to at least twice said
6 first data rate;

7 N output buffers capable of receiving fixed-size data
8 packets at said second data rate and outputting said fixed-size
9 data packets at said first data rate; and

10 a bufferless, non-blocking interconnecting network
11 capable of receiving from said N input buffers said fixed-size data
12 packets at said second data rate and transferring said fixed-size
13 data packets to said N output buffers at said second data rate.

1 2. The switch fabric as set forth in Claim 1 wherein said
2 bufferless, non-blocking interconnecting network comprises a
3 bufferless crossbar.

1 3. The switch fabric as set forth in Claim 1 wherein each of
2 said N input buffers is at least twice the size of each of said N
3 output buffers.

1 4. A method of operating a switch fabric in a fixed-size
2 packet switch, the method comprising the steps of:

3 storing incoming fixed-size data packets in N input
4 buffers at a first data rate;

5 outputting the fixed-size data packets from the N input
6 buffers at a second data rate equal to at least twice the first
7 data rate;

8 transferring the fixed-size data packets output by the N
9 input buffers at the second data rate through a bufferless, non-
10 blocking interconnecting network to N output buffers;

11 storing the fixed-size data packets transferred through
12 the bufferless, non-blocking interconnecting network in the N
13 output buffers at the second data rate; and

14 outputting the fixed-size data packets from the n output
15 buffers at the first data rate.

1 5. The method as set forth in Claim 4 wherein the
2 bufferless, non-blocking interconnecting network comprises a
3 bufferless crossbar.

1 6. The method as set forth in Claim 5 wherein each of the N
2 input buffers is at least twice the size of each of the N output
3 buffers.

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1 7. A fixed-size data packet switch comprising:

2 N input ports capable of receiving incoming fixed-size
3 data packets at a first data rate and outputting said fixed-size
4 data packets at said first data rate;

5 N output ports capable of receiving fixed-size data
6 packets at said first data rate and outputting said fixed-size data
7 packets at said first data rate; and

8 a switch fabric interconnecting said N input ports and
9 said N output ports comprising:

10 N input buffers capable of receiving incoming fixed-
11 size data packets at said first data rate and outputting said
12 fixed-size data packets at a second data rate equal to at
13 least twice said first data rate;

14 N output buffers capable of receiving fixed-size
15 data packets at said second data rate and outputting said
16 fixed-size data packets at said first data rate; and

17 a bufferless, non-blocking interconnecting network
18 capable of receiving from said N input buffers said fixed-size
19 data packets at said second data rate and transferring said
20 fixed-size data packets to said N output buffers at said
21 second data rate.

1 8. The fixed-size data packet switch as set forth in Claim 7
2 wherein said bufferless, non-blocking interconnecting network
3 comprises a bufferless crossbar.

1 9. The fixed-size data packet switch as set forth in Claim 7
2 wherein each of said N input buffers is at least twice the size of
3 each of said N output buffers.

1 10. The fixed-size data packet switch as set forth in Claim 7
2 further comprising a scheduling controller capable of scheduling
3 transfer of said fixed-size data packets from said N input ports to
4 said switch fabric.

1 11. The fixed-size data packet switch as set forth in
2 Claim 10 wherein said scheduling controller is capable of
3 scheduling transfer of said fixed-size data packets from said N
4 output ports to an external device.

1 12. The fixed-size data packet switch as set forth in
2 Claim 10 wherein said scheduling controller is capable of
3 scheduling transfer of said fixed-size data packets from said N
4 input buffers to said bufferless, non-blocking interconnecting
5 network.

1 13. The fixed-size data packet switch as set forth in
2 Claim 12 wherein said scheduling controller is capable of
3 scheduling transfer of said fixed-size data packets from said N
4 output buffers to said N output ports.

1 14. A communication network capable of transferring data in
2 fixed-size packets between a plurality of end-user devices, said
3 communication network comprising:

4 a plurality of fixed-size data packet switches, at least
5 one of said fixed-size data packet switches comprising:

6 N input ports capable of receiving incoming fixed-
7 size data packets at a first data rate and outputting said
8 fixed-size data packets at said first data rate;

9 N output ports capable of receiving fixed-size data
10 packets at said first data rate and outputting said fixed-size
11 data packets at said first data rate; and

12 a switch fabric interconnecting said N input ports
13 and said N output ports comprising:

14 N input buffers capable of receiving incoming fixed-
15 size data packets at said first data rate and outputting said
16 fixed-size data packets at a second data rate equal to at
17 least twice said first data rate;

18 N output buffers capable of receiving fixed-size
19 data packets at said second data rate and outputting said
20 fixed-size data packets at said first data rate; and

21 a bufferless, non-blocking interconnecting network
22 capable of receiving from said N input buffers said fixed-size

23 data packets at said second data rate and transferring said
24 fixed-size data packets to said N output buffers at said
25 second data rate.

1 15. The communication network as set forth in Claim 14
2 wherein said bufferless, non-blocking interconnecting network
3 comprises a bufferless crossbar.

1 16. The communication network as set forth in Claim 14
2 wherein each of said N input buffers is at least twice the size of
3 each of said N output buffers.

1 17. The communication network as set forth in Claim 14
2 further comprising a scheduling controller capable of scheduling
3 transfer of said fixed-size data packets from said N input ports to
4 said switch fabric.

1 18. The communication network as set forth in Claim 17
2 wherein said scheduling controller is capable of scheduling
3 transfer of said fixed-size data packets from said N output ports
4 to an external device.

1 19. The communication network as set forth in Claim 17
2 wherein said scheduling controller is capable of scheduling
3 transfer of said fixed-size data packets from said N input buffers
4 to said bufferless, non-blocking interconnecting network.

1 20. The communication network as set forth in Claim 19
2 wherein said scheduling controller is capable of scheduling
3 transfer of said fixed-size data packets from said N output buffers
4 to said N output ports.